APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/909,265	07/19/2001	Anthony Vernon Walker Smith	15-979	9891

7590 06/02/2004	EXAMINER	
Norman P Soloway	LI, SHI K	
HAYES SOLOWAY PC		
130 Cushing Steet	ART UNIT	PAPER NUMBER
Tucson, AZ 87501	2633	8

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *19 July 2001*.
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-37* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) *1-9,11,16,17,19,20 and 25-37* is/are rejected.
7) ☒ Claim(s) *10,12-15,18 and 21-24* is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a) ☐ All   b) ☐ Some * c) ☐ None of:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____.
   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____ .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2.   Claims 25, 31 and 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3.   Claim 25 recites the limitation "said performance parameter" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

4.   Claim 31 recites the limitation "said regenerator search tree" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

5.   Claim 35 recites the limitation "said performance parameter is Q" in lines 1-2 of the claim. Q is not well defined in the specification as well as the claim.

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless —
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2.   Claims 1, 3-4, 16 and 36 are rejected under 35 U.S.C. 102(a) as being anticipated by Kim et al. (S. Kim et al, "Regenerator Placement Algorithms for Connection Establishment in All-Optical Networks", IEE Proc-Commun., Vol. 148, No. 1, February 2001).

Kim et al. teaches a method for establishing a connection in a WDM network. Kim et al.

teaches connection request in p. 26, right col., first paragraph. Kim et al. then teaches to use

dynamic programming to compute cost of each viable regenerator path. Finally, Kim et al.

teaches to choose the path with minimal cost for the connection (see p. 27, Section 2.1, *Problem*

Formulation Using Dynamic Programming).

Regarding claims 3-4, Kim et al. teaches to select path based on occupation cost.

Regarding claim 16, Kim et al. teaches in Table 3 to order the viable regenerator paths in

a matrix according to the number of regenerators (K regenerators are used in stage K).

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

4.   Claims 2, 5-9, 11, 19-20, 26-28, 30 and 34 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Kim et al. (S. Kim et al, "Regenerator Placement Algorithms for Connection

Establishment in All-Optical Networks", IEE Proc-Commun., Vol. 148, No. 1, February 2001) in

view of Banerjee et al. (D. Banerjee et al., "A Practical Approach for Routing and Wavelength

Assignment in Large Wavelength-Routed Optical Networks", IEEE Journal of Selected Areas in

Communications, Vol. 14, No. 5, June 1996).

Kim et al. has been discussed above in regard to claims 1, 3-4, 16 and 36. Regarding

claims 2 and 19-20, the difference between Kim et al. and the claimed invention is that Kim et al.

does not teach constructing N valid link paths. Kim et al. focuses on regenerator placement

given a route from a source to a destination. Banerjee et al. teaches to find a route given a source and a destination. Banerjee et al. teaches to use extended breadth-first search which terminates after it has found a desired number of alternate paths (see p. 904 right col., first paragraph). One of ordinary skill in the art would have been motivated to combine the teaching of Banerjee et al. with the regenerator placement method of Kim et al. because given a source and destination a route must be chosen first in order to apply the method of Kim et al. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply extended breadth-first search to find a route between a source and a destination, as taught by Banerjee et al., and then apply the regenerator placement method of Kim et al. to the chosen path.

Regarding claim 5, breadth-first search uses a path search tree.

Regarding claim 6, extended breadth-first search terminates after it has found a desired number of alternate paths.

Regarding claim 7, it is well known in search tree method to abandon branches that are unlikely to give satisfactory result.

Regarding claim 8, Banerjee et al. teaches in p.904, left col., last paragraph to reduce the number of variables by eliminating links that are not pass through. It is obvious to also eliminating nodes that are not pass through and include link and node that must pass through to further reduce the number of variables.

Regarding claim 9, Banerjee et al. minimizes the hops (cost) of the path.

Regarding claim 11, it is obvious that if a breadth-first search reaches all its leaves, the algorithm terminates.

Regarding claims 26-28 and 30, it is obvious to include routing module, regenerator placement module, wavelength assignment module and control unit for implementing the modified regenerator placement method of Kim et al. and Banerjee et al.

5.   Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (S. Kim et al, "Regenerator Placement Algorithms for Connection Establishment in All-Optical Networks", IEE Proc-Commun., Vol. 148, No. 1, February 2001).

Kim et al. has been discussed above in regard to claims 1, 3-4, 16 and 36. The difference between Kim et al. and the claimed invention is that Kim et al. does not teach to declare a best path when an aggregate occupation cost above a threshold. However, it is obvious that at each stage, the smallest number in the row can be considered as a threshold. If an aggregate occupation cost at the destination node of an earlier stage is less than the threshold, the corresponding path is the best. For example, in Table 3, since the aggregate occupation cost at node 10 of stage 5 is 1.588 and is less than any number in row of stage 6, the corresponding path is the best. One of ordinary skill in the art would have been motivated to declare a viable regenerator path as best without completing the whole calculation in the method of Kim et al. because such approach shortens the calculation time and establishes connection quickly. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to declare a best path without completing the calculation cost for all possible paths in the method of Kim et al. because such approach shortens the calculation time and establishes connection quickly.

6.   Claims 29, 31-33 rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. and Banerjee et al. as applied to claims 2, 5-9, 11, 19-20, 26-28, 30 and 34 above, and further in

view of Jukan et al. (A. Jukan et al., "Service-Specific Resource Allocation in WDM Networks with Quality Constraints", IEEE Journal on Selected Areas in Communications, Vol. 18, No. 10, October 2000).

Kim et al. and Banerjee et al. have been discussed above in regard to claims 2, 5-9, 11, 19-20, 26-28, 30 and 34. The difference between Kim et al. and Banerjee et al. and the claimed invention is that Kim et al. and Banerjee et al. do not teach user defined performance constraints. Jukan et al. teaches that service-specific connection requests has become increasingly important and in setting up lightpath connections, quality-of-service (QoS) must be taken into consideration (see p.2051, left col., first paragraph. Jukan et al. presents in FIG. 1 a generic approach and in Section III algorithms for wavelength routing and resource allocation. One of ordinary skill in the art would have been motivated to combine the teaching of Jukan et al. with the modified method of Kim et al. and Banerjee et al. and include user defined performance constraints in selecting paths because lightpath for difference services requires different QoS and if the QoS of a path does not meet the user requirement it cannot be accepted for providing service. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include user defined performance constraints in addition to cost, as taught by Jukan et al., in selecting path in the modified method of Kim et al. and Banerjee et al. because lightpath for difference services requires different QoS and if the QoS of a path does not meet the user requirement it cannot be accepted for providing service.

7.   Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (S. Kim et al, "Regenerator Placement Algorithms for Connection Establishment in All-Optical

Networks", IEE Proc-Commun., Vol. 148, No. 1, February 2001) in view of Levandovsky et al. (U.S. Patent Application Pub. 2002/0063915 A1).

Kim et al. has been discussed above in regard to claims 1, 3-4, 16 and 36. The difference between Kim et al. and the claimed invention is that Kim et al. does not teach to evaluate paths based on an end-to-end performance parameter. Levandovsky et al. teaches in FIG. 3 to evaluate path based on its BER. One of ordinary skill in the art would have been motivated to combine the teaching of Levandovsky et al. with the method of Kim et al. because a path cannot be used to provide service unless its BER is within an acceptable range. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to evaluate paths based on its BER to select a best path, as taught by Levandovsky et al., in the method of Kim et al. because a path cannot be used to provide service unless its BER is within an acceptable range.

Allowable Subject Matter

8.   Claims 10, 12-15, 18 and 21-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 703 305-4341. The examiner can normally be reached on Monday-Friday (8:30 a.m. - 5:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703 305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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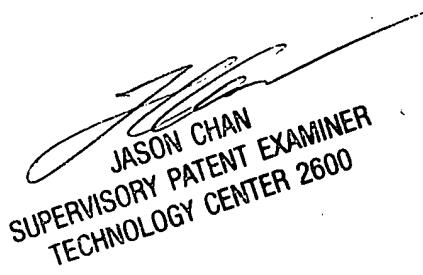
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